

**MEETING NOTES**  
**VOI Community of Practice Meeting**  
**September 22, 2016 | 10:00 AM – 11:30 AM**  
**Call-in number: 800-779-9660 | Passcode: 542-9511#**

<b>Invited Participants: (*Attended):</b> Jeffery Adkins (NOAA)* Gary Anderson (NIST)* Sid Boukbara (NOAA) Peter Chaikin (Applied Planning Corp) * Sarah Cline (DOI)* Denna Geppi (NOAA)* Monica Grasso (NOAA)* Jennifer Sprague-Hilderbrand (NOAA) Karen Jenni (USGS) * Jason Kim (NOAA) * Jamie Kruse (East Carolina University) Haydar Kurban (Howard University)* Michelle McClure (NOAA)	Ben Miller (RAND)* Marilyn Murphy (NOAA) Josh Nowlins (ECS) * Lou Nadeau (ERG)* Toni Parham (NOAA) Emily Pindilli (USGS)* Tracy Rouleau* Sarah Ryker (USGS) Carl Shapiro (USGS)* Ben Simon (DOI) Adam Smith (NOAA)* Susan Taylor (ABT Associates, Stacy?)* Valerie Were (NOAA)*
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**Action Items:**

- Denna will schedule the next VOI Community of Practice Meeting for November 2016.
- Denna will add the studies listed in the appendix of the GPS appendix to the VOI COP Study Spreadsheet.
- Denna will send an email with actions for the next meeting, along with the link to the new NOAA Office of Performance, Risk, and Social Science website, minutes, and a doodle poll to determine a meeting day/time for November's meeting.
- Working group members will continue to conduct outreach and provide input on additional agencies and points of contact to invite participants to the community of practice.
- Working group members will continue to add studies to the VOI Spreadsheet of collected case studies.

**Roll call and Introductions**

- Monica Grasso, NOAA's Chief Economist started off the meeting by stating that this is the fourth meeting of the VOI Community of Practice. Monica mentioned that the group is continuing to grow with new participants joining the group today.

- During the June 28<sup>th</sup> call, the Community of Practice (COP) discussed that future calls were going to focus on discussions regarding the substance of VOI studies and lessons learned. To do this, the COP decided to bring presentations to the COP meetings.
- Today's meeting features the first presentation from Jason Kim, Senior Advisor in the Space-Based Positioning Navigation & Timing National Coordination Office on the GPS Economic Benefits Assessment.

### **Setting the Stage**

- Jeff Adkins gave an overview of the Community of Practice for new participants. The goal for this Community of Practice is to improve the quality and consistency of VOI studies. This Community of Practice can also serve the role of coordinating and strengthening the connections between the U.S. Agencies and partners and GeoValue, the International group, doing similar things on the international scale.
- The purpose of this group is to (1) Talk amongst ourselves to identify best practices and (2) Share best practices and information with the international group.
- Carl Shapiro stated that he is our point of contact who interacts with the international community.
- Carl mentioned that the GPS Economic Benefits Assessment was a large study conducted last year and there was a lot of interest in across federal agencies. He mentioned that there are a lot of people on this call who were involved in this report.
- Moving forward, Jeff mentioned that looking at studies that involve multiple federal agencies and discussing them will be a big part of what we do during these meetings.
- Carl then gave an overview of upcoming GEO activities. Currently, the GEO community is in the process of developing case studies that provide examples of the value of geo scientific information across different agencies. Initial discussion is underway about the next large workshop. Tentatively, the University of Colorado in Boulder is the next location, sometime in the summer of 2017. The last international workshop was hosted by OECD in March of 2016 in Paris, France.

### **Study Presentation: GPS Civilian Economic Value to the U.S., Interim Report**

#### **General Overview**

- Jason Kim, Senior Advisor is a NOAA employee on detail to the GPS office.
- Jason discussed how important commercial activities use and rely on GPS. GPS is used for a lot more than just Pokémon GO. There is an entire government structure that is about GPS run through the Army.
- Presidential policy on GPS is designed to promote our economic guidance. There are no restrictions on its use for civilian purposes.
- This kind of work is hard to do for many reasons. First, we do not know exactly what the ROI is. If we spend 1 billion a year on this investment, what is the ROI on that?
- This study shows that in just one year, we can show many benefits, not just economic benefits.

- In regards to GPS, there are no open data or open sources. We are working with industry on these standards to make sure that these are clear.
- Ligado (sp?) is trying to build a network that is 5 times more powerful than GPS. This is was lead to the creation of this study.
- GPS is used for a lot of different things. We can wave our hands and say it is important, however if we can show the value of this it would be so much more important.
- DOC was charged with the task of demonstrating the value of GPS, not just the economic analysis. The goal was to determine what GPS is are actually used for. This was the task in 2014, lead by DOC.
- There were a lot of team members working on this project, including the former governor of Wyoming. This was an interagency effort, however it did not garner interagency support in the final study.

### **Report Presentation**

- The work plan for this study was to break this report into chunks with available FY 14-15 money from NASA.
- This study looked at the existing data sources that were available.
- Precision agriculture systems using GNSS, the generic term that is used for Europe's GPS, saved an estimated 10-15% in operating costs and purchased inputs based on a composite of estimates of several studies. Crop yield increases associated with improved plant health were estimated at 9-10%. The composite estimates looked at cost reductions + yield increases.
- Irv Leveson conducted a literature review to see what was already out there. We could not do primary data collection in this first phase.
- Jason stated that they decided to look at an area and add up that data to see what they can come up with to determine this and then Irv would identify the gaps.
- The original idea was to break this report into three phases.
  - The approach in this first phase was to focus on productivity benefits, not sales of equipment and focus on the marginal benefits of GPS vs. alternatives. This work also focused on areas with the most robust, credible data, however there were still many assumptions and professional judgement.
  - The second phase was to actually collect the data. Irv collected this data and created a database of economic benefits.
  - The third phase was to model this to see what the future is going to hold and what the benefits would be, including model impacts of GPS loss under various scenarios and an extrapolation of future and global benefits.
- GPS cannot claim all the benefits of transportation, however there are some benefits.
- Jason stated that they wanted to look at the group of benefits. Economists were concerned with making sure that the end project was credible. They did not want Irv to go off and speculate. They were not looking at the same time period, application area for all of these uses. For example, Irv was looking at farming but was only able to narrow it down to grain farming.. Because of this, Irv had to make some professional judgment calls. Some areas were very difficult because of the lack of data

- The study went on despite the lack of full endorsement from all the agencies involved..
- The goal was to keep with the economic metric standards.
- The study ended up identifying nine industry application areas. This was tiny sample of the universe that GPS is used in. Each industry has their own unique ways of using GPS.
- GPS is like a tool, it is not information in and of itself, it is a tool for generating information.
- GPS puts out signals saying I am here; it's just a reference. It is up to the user to generate what this information means to them.
- We need to determine what would be the difference if GPS never existed. Those types of questions end up underestimating GPS value. Without this information, the information generated through GPS would not exist.
- The Federal Communication Commission's requirements for Enhanced 911 is what got GPS into cell phones. This is one of the cases where counterfactual information does not work and underestimates the value.
- You have to apply some percentage to that phone or application in regards to the value of GPS. According to Dr. Leveson, there was no way of doing that so he had to use his best judgment. This is where folks were getting uncomfortable. Dr. Leveson did show the math so people could run this information for themselves and demonstrating how it can be done. There is lots of information in this report and it was difficult to pare it down because one thing that was relevant to one agency is not necessarily to another.
- Throughout this process, it is becoming clear that the study should focus on the increases in the (agricultural?) yield, the inputs not the outputs.
- For example, the output of maximizing the land use. Yields go up, the plants are healthier when they are treated more frequently. This increases inputs and outputs.
- The limitations of the study were that it was only one year in the U.S. and that it excluded major application areas due to lack of credibly/applicable data on health, human safety, and the environment.

#### **Lessons Learned:**

- Dr Leveson stated that a deeper dive with the experts is the way to determine how the technology is applied. You have to interview a lot of experts to get their understanding.
- A major part of any benefit study is improving knowledge of users and applications.
- It is important for benefit studies to include both economic benefits and non-economic benefits such as those to safety-of-life and the environment.
- Studying future benefits can help plan programs and provide benchmarks to assess them.
- It is necessary to be eclectic with regards to methods of measuring benefits because of varying ability and characteristics of data.
- Separating impact of jointly operating programs or technologies requires tough judgements.
- Choosing alternatives without GPS for comparison with GPS requires understanding of changing technologies and markets.
- Jason said one of the lessons learned was making the distinction between economic benefits and non-economic benefits. It is hard to quantify environmental benefits. Jason thinks you can.

- In the future, we need to be able to communicate this information in a way to influence policy and program changes.
- Jason discussed that the allocation of the benefits of GPS versus other technologies that are being used is an area where it is hard to determine how do you figure out a number to come up with this. This is a difficult issue.
- Critical infrastructure is dependent on GPS. (ex. farming and other 24 hour operations).
- We need to create a way to back up this system and although there have been discussions about back up systems, no one is stepping forward to pay for it.
- We need a statement now that illustrates what the potential loss to the U.S. economy if we lose GPS for 30 days. Cell towers can last 24 hours. What is a long-term disruption of GPS going to do to the U.S. economy (ex. a solar event that burns out GPS receivers)? What will we lose without a backup. This is going to be the focus of the new work.
- There is a new study that Gary Anderson for NIST is about to initiate that is looking at the timing benefits of GPS in specific areas.
- Jason and his team are going to leverage this funded work to see if they can build it up to support the next phase. The plan is to look at where there was the least amount of satisfactory results from the last phase to shape the new study.
- Jason stated that we know that there are many benefits of GPS data, however there needs to be a universal way to communicate that value. The focus of the new study will be the future of GPS, not the past. The current NIST study is focusing on the past.
- The new study will look at global benefits of GPS, not just U.S. benefits.

#### **Discussant Remarks**

- Two Community of Practice members served as discussants for this meeting: Lou Nadeau from ERG and Sarah Cline from DOI.
- Lou discussed four categories, alternatives to the methods, and implications. The approach that Lou took while reviewing this report was to think about how the study applies to the VOI CoP and their respective institutions.
- Lou shared praise for the study and stated that it was responsibly done.
- Lou specifically liked the fact that there were sector specific methods and concerns. This is not always appreciated in this field; Dr. Levenson did a great job.
- Lou discussed how Dr. Leveson started with the estimates that are in the main part of the report. He said there was value in the appendix that contains details all of the studies used for the estimates. This is great and very valuable for any researcher.
- Lou suggested that for future work, it would be useful to go into one or two sectors in depth.
- Lou then shared a few concerns he had with the study. The first concern was the documentation in the numbers. There were numbers in the study that were left undocumented. Lou mentioned that was probably because of the professional judgment calls that had to be made, however you can get to how we calculated those numbers by doing the math. Lou mentioned that you can recalculate the tables that Dr. Leveson made, however it would have been helpful to see more justification for the best professional judgments in the actual document.

- Lou also mentioned that there could have been a better linkage to economic theory in either the text or the appendix.
- Lou said the implications and looking forward to this community of practice. This study is important to the community of practice and the estimates are useful. He said the methods were a good starting point.
- Lou stated that a valuable part of this study was the value chains. He mentioned that he would have liked to see this completed for each of the sectors. He also mentioned that he would have liked to see this information in graphical form as this would have helped to show the value.
- Lou said we are not all economists so we need to produce information that is digestible by non-economists.

## **Open Discussion on GPS Report**

### **Conversation on Discussion questions**

- Jason stated that Lou made some excellent points. He discussed that in terms of the deep dive, the next phase will look at a limited subset of the timing applications more closely.
- Jason said that funding was one of the big limitations of this study. The team only had 6-8 months to go through the entire study.
- Jason said that while the NIST work continues, they are in the process of figuring out the cost of what an extensive study would be.
- Jason said that the Department of Defense offered to pay for something more comprehensive. This study was more spur of the moment and was “quick and dirty” in terms of the documentation.
- Jason also discussed how the visual depiction of the value chain did not connect to the calculations. Jason believes that this was just meant to be a visual representation of the value chain.
- Jason said that GPS is a tool for generating information. It is a beacon for different folks who depend on the Presidential budget to get the billions of dollars we need to get these satellites going. This report will be helpful for education and outreach during funding solicitation.
- Gary Anderson (NIST) mentioned that where we need to be focusing on is showing the harm we are putting ourselves in by not having this data. The harm of not having this information is different among sectors however, it will be hard to put a standardized value throughout different sectors.
- Haydar Kurban (Howard University) agreed that there needs to be a connection between the numbers presented and the economic theory. We need to identify how many industries are using this information and what are the outputs.
- Carl Shapiro asked if the study team was given a specific policy question they were looking at, or where they were looking at benefits of impacts. He also asked if there are any plans to publish this study through a more formal peer review.
- Jason stated that Dr. Leveson did publish this study in a non-peer-reviewed trade journal.

- The group then discussed how what is produced and what the users need are two different things. The goal is to create broadband information for America, but GPS is necessary for this goal. The original suggestion to calculate the economic value of GPS came from someone in the White House.
- Gary stated the current practice is to get a big number so economists can go justify this is what they need to do. For example, give me X amount of dollars because it is going to have X amount of impact later on.
- Timing research is a topic the group thought as an emerging important issue. We are going to have to look at policy in economic studies, such as economic agricultural and investment decisions. We need to ask questions such as “Does it make sense for farmers to invest in X?”
- Jeff Adkins said that economic studies need to focus on application-specific impacts (benefits to specific end users and specific uses). He added that this is not entirely an economic question: we need to understand the engineering and operational responses that our information makes possible.
- Jeff Adkins said that we should have a future discussion of how to treat national vs. global benefits. Are benefits to the US a better justification for expenditures by the US in generating information? If so, what do we do with the benefits that spill over to the rest of the world?
- The second discussant, Sarah Cline stated that a lot of the critiques and feedback she had regarding the study have already been recognized. She stated her comments build on what Carl was talking about. Specifically, how to influence the policy. She mentioned that ballpark estimates are useful, but we need to be thinking more about specific types of policy questions. In the future it would be helpful to think about specific areas that we outline in this report that would be helpful with getting more precise estimates. She also mentioned that since this study came out, USDA had a study come out with the farm level data.

### Next Steps

- Denna will add of the studies listed in the GPS appendix and add them to the VOI COP Study Spreadsheet.
- Denna will send an email with actions for the next meeting, along with a link to the new NOAA Office of Performance, Risk, and Social Science website, minutes, and a doodle poll to determine a meeting day/time for November’s meeting.

### Attachments:

- [GPS Civilian Economic Value to the U.S., Interim Report](#)
- [Presentation on GPS economic study](#)
- [Discussion Questions: GPS Civilian Economic Value to the U.S. Report](#)
- [Draft objectives for the Community of Practice](#)
- [Spreadsheet of collected case studies](#)
- [Minutes from June 28<sup>th</sup> meeting](#)
- [COP Invitation E-mail](#)
- [VOI: Spreadsheet for additional Points of Contact](#)